

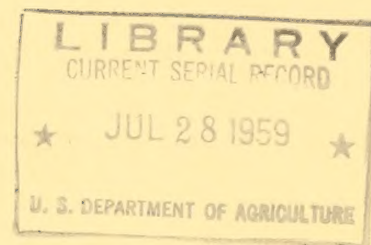
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FEDERAL-GRANT RESEARCH

at the

STATE AGRICULTURAL

EXPERIMENT STATIONS

Projects on

WEED CONTROL

Part 24

Agricultural Research Service  
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled May 1958 by

The State Experiment Station Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued June 1958

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## INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204(b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.





## BASIC INVESTIGATIONS

- Ala.            Causes of Variability in the Activity of Herbicides. To (1) study effects of the following on activity of herbicides: a. environmental factors, b. plant factors, and c. non-herbicidal agents, as spreaders, stickers, and other agents; and (2) search for new herbicides, looking for a specific type of chemical to break a link in reproductive or vegetative cycle of a particular weed.  
Bot. 545 (S-18)
- Calif.        Physiological and Biochemical Studies on Weed Control. (1) Continue work on reaction of new herbicides in soils as pre-emergence materials in a number of crop and weed species; observe soil reactions; study breakdown in soils. (2) Continue studies on relation of composition of clays to fixation of herbicides. (3) Conduct soil tests on a number of new chemicals. (4) Study role of light, nutrition, temperature, and humidity in plant response to herbicides.  
Bot., Agron., Veg. Crops 883
- Calif.        The Anatomical and Physiological Responses of Woody Species to Herbicides. A Program of Brush Control for California. To (1) study toxic action of chemicals on woody plants in relation to plant structure, age, seasonal growth and environmental factors; (2) make physiological studies for species tolerance, mechanics of absorption, translocation into roots, and biochemistry of killing action; and (3) make exploratory work with new materials.  
Bot. 1400
- Calif.        The Translocation of Herbicides in Plants. The Use of Radioactive Isotopes and Other Indicators to Study Absorption and Distribution of Herbicidal Chemicals. To (1) study relation of molecular configuration to absorption and translocation of herbicides, (2) determine when applied chemical enters the plant and in what quantity, and (3) know their ultimate distribution with respect to vulnerable meristematic tissues.  
Bot. 1430
- Calif.        Effects of Fumigants, Insecticides, and Herbicides on Soil Productivity. Learn (1) influence of soil properties and various soil management practices on effectiveness of fumigants, insecticides, and herbicides; (2) effect of fumigants, insecticides, and herbicides on chemical, physical, and microbiological properties of soil with special reference to soil productivity.  
Soils, Pl. Nutr., Ent. 1532



- Calif.      Penetration of Herbicides. To (1) learn how to increase penetration of herbicides and thus enhance the possibility of greater effectiveness in their use; and (2) study intimate mechanisms involved in passage of such chemical across plant membranes.  
Bot. 1583 (W-11) Coop. USDA
- Colo.      Studies on Physiological Factors Related to Weed Control. To (1) learn relationships of physiological activities to herbicidal reaction; and (2) relate these studies toward devising or improving means of controlling or eradicating weeds with maximum efficiency and minimum injury to associated plants, soils, animals, and man.  
Bot. & Pl. Path. 214 (W-11)
- Storrs  
(Conn.)      The Influence of Soil Factors on the Herbicidal Effectiveness of Certain Carbamates. To determine the influence of soil moisture, texture, organic matter content and pH upon herbicidal activity of these carbamates: isopropyl N-(3-chloro-6-methoxyphenyl) carbamate, sec. butyl N-phenyl carbamate; isopropyl N-(3-chloro-6-methoxyphenol) carbamate, isopropyl N-(3-methylphenyl) carbamate, isopropyl N-3, 6-dichlorophenyl) carbamate, and isopropyl N-(3-chloro-phenyl) carbamate.  
Pl. Sci. 221 (NE-12)
- Del.      Persistence and Penetration of CMU in Asparagus Soils. To determine degree of persistence and penetration of CMU (3-parachlorophenyl-1, 1-dimethylurea) in asparagus soils particularly as affected by irrigation and soil organic matter.  
Hort. 55-H (NE-12)
- Fla.      The Effects of Simulated Rainfall on the Herbicidal Activity of DNBP and 2,4-DES. Learn effects of rates and frequencies of simulated rainfall under different conditions on the herbicidal activity of DNBP and 2,4-DES.  
Agron. 839 (S-18)
- Ga.      Evaluation of Several Environmental Factors Influencing the Absorption and Translocation of Herbicides by Johnson Grass. (1) Study the absorption and translocation of chemicals which appear promising for eradication or control of Johnson grass and nutgrass. (2) Investigate production and dormancy of Johnson grass seed.  
Agron. 108 (S-18) Coop: ARS
- Idaho      Physiological and Anatomical Effects of Herbicides and Associated Treatments on Canada Thistle, Perennial Ground Cherry, Field Bindweed, and Poverty Weed. To develop information on behavior of four above named weed species as: relative rate and direction of translocation of herbicides and effect of associated treatments which may facilitate translocation; comparative anatomy or morphology of these species and relation of these factors to environmental adaptability, competitive ability and methods of control; effect of chemical and mechanical treatments on vegetative and sexual reproduction.  
Agron. 295 (W-11)

- Idaho      The Biochemical Basis of Resistance and Susceptibility of Plants to Carbamate Herbicides. Learn reasons for susceptibility and resistance of plants to carbamate herbicides.  
Agr. Chem. 344 (W-52 for future activation)
- Ill.      The Adsorption Movement, and Effect of Herbicides in Plants and Soils. (1) Study factors affecting adsorption and translocation of herbicides in higher plants. (2) Study residue, movement, and nature of absorption of herbicides in different soils.  
Agron. 15-378
- Ind.      Physiological Studies of Herbicides in the Control of Perennial Weeds. To (1) learn seasonal variations in chemical constituents of perennial weeds and correlate variations with the efficacy of various cultural and chemical control practices; (2) investigate movement of herbicides in underground portions of certain perennial weeds and learn influence of additives and environment on this movement; and (3) investigate tolerance of weed and crop plants to promising herbicides and to study physiological response of plants to such materials.  
Bot., Pl. Path. 778
- Ind.      Studies of Germination of Weed Seeds. (1) Study specific requirements for germination in weed seed; correlate requirements with life of these seeds in field. (2) Devise chemical methods for forcing or inhibiting germination of seeds in soil.  
Bot., Pl. Path. 972 (NC-10)
- Maine      Penetration and Persistence of Dalapon and CMU in Undistributed Podzol Profiles and Their Absorption by Woody Plants. To learn effect of spacial distribution of organic materials on phytotoxicity of Dalapon when applied to virgin podzol soils.  
Agron. 90 (NE-12)
- Md.      Influence of Environmental Factors on the Effectiveness of Several Carbamate Herbicides. To (1) determine influence of water, soil texture, soil pH, soil fertility level, and temperature on effectiveness of several carbamate herbicides; and (2) physiological, chemical and morphological changes in plants induced by use of these herbicides.  
Agron. B-58-d (NE-12)
- Mass.      The Relation of Some Environmental Factors and Chloro CIPC Applications to the Growth of Onions. (1) Learn relation of CIPC applications and soil texture and moisture to growth response and plant injury of set onions; (2) what conditions are responsible for damage resulting from this treatment. (3) Make study of factors as: toxicity of CIPC to plants at temperatures below 60°F., effect of rains leaching herbicides into root zone of crop.  
Hort. 92 (NE-12)



- Mich. Control of Weeds by Chemical Means. To determine (1) some effects of herbicides on basic physiological processes of weeds and crop plants; (2) effects of herbicides on production, keeping quality and palatability of vegetable crop products; and (3) effects of continued application of herbicides upon growth of crop plants and weed populations in treated soils.  
Bot., Farm Crops 32 Coop. ARS
- Mich. A Study of the Antimitotic Action of Various Organic Compounds Used as Insecticides, Fungicides and Herbicides. To (1) assess antimitotic and potential mutagenic action of compounds used in insect, fungus and weed control where previous field or chemical studies may suggest that they have such activity; and (2) classify active compounds as to type of antimitotic activity shown on basis of established reactions.  
Bot. and Pl. Path. 99
- Mich. The Role and Fate of Herbicides, Antibiotics, Growth-Regulating Substances and Other Compounds in Different Soil Types. To (1) study residual effects of herbicides, antibiotics and plant hormones in different soils; (2) find effect of various compounds on microbial flora of soils; (3) find species of bacteria which might prove helpful in aiding disintegration of herbicides; and (4) determine effect of biuret on plant growth, to determine the cause of transformation of urea to biuret, and to determine biuret content of various commercial sources of urea.  
Bact, Hort, Soil Sci. 123
- Mich. Factors Affecting the Germination of Weed Seeds. To determine (1) physiological characters of dormancy in weed seeds; (2) needs for testing viability of weed seeds; (3) factors affecting weed seed longevity; and (4) develop methods of weed control based on such improved understandings.  
Bot. and Pl. Path. 467 (NC-10)
- Minn. Weed Studies:--3. The Physiologic and Anatomic Effects of Herbicides on Weeds and Economic Crop Plants. To (1) elucidate pertinent phases of the weed problem, (2) formulate control measures, (3) evaluate control measures, and (4) make recommendations through proper channels to put findings into practices.  
Agron., Bot, For., Hort., Pl. Path. 2201-3
- Miss. Factors Relating to the Vegetative Reproduction in Some Perennial Weeds of Mississippi. (1) Learn population and extent of underground reproductive systems; (2) how herbicide that shows some control is effective and why it does not give complete control; (3) influence of external factors on production of above-ground parts by under-ground organs; (4) internal factors that may influence vegetative reproduction. (5) Study means by which translocation of potentially herbicidal substances to all under-ground parts may be enhanced; (6) means by which dormant underground reproductive organs might be induced to produce above-ground foliage and become amenable to chemical treatment.  
Pl. Path. and Physiol. HL-20



Miss. Studies on the Effect of Herbicides on Weeds and Crops. To (1) study absorption, translocation and certain physiological actions of selected herbicides in appropriate plant species; (2) study histological and cytological responses of cotton and perhaps other species to selected post-emergence herbicides and seek to determine if differences in internal and external morphology of certain species are responsible for differential responses to some herbicides; (3) determine movement pattern, persistence, and action on crop species of herbicides in different soils; (4) evaluate influence of climatic and soil factors upon vapor activity and herbicidal action of promising herbicides; and (5) evaluate effects of new herbicides upon selected crops and weeds and develop practical methods for safe use in controlling weeds on cropland and other areas.

Pl. Path. RRFL-1 (S-18) Coop. USDA

Miss. The Residual Effect of Various Herbicides on Cotton and Other Crops. To (1) determine rate of disappearance of certain herbicides from soil under field conditions; and (2) evaluate effects of these herbicides on crop and weed plots under varying soil conditions.

Pl. Path. RRFU-3 (S-18)

Miss. Studies of the Effects of Herbicides upon Weeds and Crops. To (1) study physiological action of herbicides upon crops and weeds; (2) determine influence of climatic, biotic and edaphic factors on action of selected herbicides; (3) determine effects of herbicides on soils and plant succession following their use; and study their movement patterns in soils; (4) evaluate effects of new herbicides upon selected crops and weeds; (5) develop agricultural usages and practical methods of employing herbicides for controlling weeds selectively in crops and grasslands, ponds, orchards, etc.; (6) develop methods of employing herbicides for non-selective control of weeds in non-agricultural areas; and (7) develop, adapt, and evaluate equipment for accomplishing objectives (5) and (6).

Pl. Path. PL-18 Coop. USDA

Mont. Factors Affecting Sagebrush (*Artemisia tridentata* Var. *Tridentata* Nutt.) Seed Germination. To determine effect of temperature, moisture, and other factors on the capacity of sagebrush seed to germinate, in order to develop a sounder basis for prediction of success of artificial measures leading to the reduction of sagebrush stands.

Agron. & Soils, Bot. & Bact. 107, MS 924 (See W-25 in Part 10)

Mont. Physiological and Ecological Factors Influencing the Life Cycle of the Wild Oat (*Avena fatua*) as Related to Control. To (1) determine factors which influence dormancy, germination and longevity in wild oat seed; and (2) develop methods of reducing the wild oat seed population in cultivated soils.

Agron. 140, MS 927 (W-11)

- Mont.      The Effect of Chlorophenoxy Acids on Glycosidic Cyanide Formation.--Find site(s) at which chlorophenoxy acids cause inhibition of glycosidic cyanide formation in the metabolic conversion of nitrogenous materials to glycosidic cyanide.  
Chem 1075
- Nebr.      Factors Affecting Bud Dormancy in Plants. To determine nature of bud dormancy in plants and to develop weed control measures based on such findings. 1. Biochemical analysis of plant and bud tissues to determine inherent control mechanisms such as enzyme levels, hormones, growth substances, carbohydrates, etc. 2. Determine effects of varying nutritional levels through use of tissue culture technique using excised buds. Compare proteins, amino acids, carbohydrates and enzymes. 3. Screen and develop chemicals which may have value in inducing or breaking bud dormancy, starting with ethylene chlorohydrin, indoleacetic acid, phenoxyacetic acid, and urea derivatives.  
Agron. 478 (NC-10) Coop. ARS
- N. H.      Light and Temperature Effects on Phototoxicity with Respect to Herbicides. To study (under greenhouse and controlled environmental chambers) effects of light intensity, light quality, and temperature on toxicity to plants of herbicides with emphasis on 2,4-D acids and several of its derivatives, and CMU and others of substituted ureas.  
Bot. 90 (NE-12)
- N. J.      Movement, Persistence, and Activity in Soil of Formulations of Phenoxy, Carbamate, and Substituted Urea Herbicides.--To make further research on phenoxy, carbamate, and substituted urea compounds to evaluate movement, persistence, and retention on soil colloids, and to provide basic information on these factors which will assume their satisfactory use.  
Farm Crops 257 (NE-12)
- N. Mex.      The Association of Plant Characters with the Differential Tolerance on Strains of Field Bindweed to Growth Regulator Herbicides. To (1) screen field bindweed for strains with differential tolerance to killing action of growth regulator herbicides; (2) determine if differential tolerance of bindweed strains is related to apparent differences in translocation of growth regulator herbicides; and (3) relate differences in carbohydrates, N compounds, respiration and metabolic products to selective action of regulators on bindweed strains.  
Agron. 47 (W-11) Coop. ARS
- N. Y.      The Role of Soils in Plant Response to Herbicides. To study (Cornell) (1) influence of soils on fate of herbicides; (2) influence of herbicides on soils; and (3) plant response to herbicides as influenced by the two factors above.  
Agron. 55 (NE-12)



- N. Y.      The Influence of Soil Factors on the Activity of Herbicides.  
(Cornell) To determine (1) effects of soil moisture, organic matter, texture and related factors on the fate and activity of important herbicides such as the phenoxy compounds, carbamates, ureas, dinitros, etc.; and (2) develop working recommendations for these herbicides over widest possible range of environment.  
Veg. Crops 167 (NE-12)
- N. C.      The Effect of Herbicides upon the Germination and Growth of Certain Crops as Influenced by Environment Species and the Physiological Condition of the Plant. To study (1) effect of certain pre-emergence herbicides upon germination of cotton, peanuts, soybeans, and forage crops as influenced by relationships between rainfall, soil physical properties, temperature, and rate and time of application of herbicides; (2) effect of certain post-emergence herbicides upon some of more important forage legumes as influenced by relationships between species, age, stage of growth, and physiological conditions of plants.  
Farm Crops 173(S-18) Coop. ARS
- N. Dak.      Some Factors Affecting the Control of Annual Weeds. To determine physiological and environmental factors affecting germination, dormancy and viability of annual weed seeds and devise improved chemical or cultural control methods.  
Agron., Bot. 9-3 (NC-10) Coop. FES
- Okla.      Basic Mechanism of Herbicidal Action. To (1) determine rates of absorption and distribution within plant of chemical compounds that may be effective herbicides; (2) determine relative movement of herbicides into root system of woody plants; (3) determine the tissues involved in translocation; (4) determine factors affecting translocation; (5) study changes in chemical composition of plant cells after herbicide treatment, especially cell wall changes; and (6) learn effects of herbicides on growth hormone systems of plant in effort to learn if herbicides are acting on the natural auxins responsible for plant growth.  
Agron., Bot., Chem., Pl. Path. 888 Coop. ARS
- Oreg.      Herbicide Residues: The Evaluation and Development of Analytical Procedures and the Study of Basic Relationships of Herbicide Residues. (1) Evaluate analytical procedures and adapt them to determination of herbicide residues on crop plants. (2) Develop methods of analyses for herbicide residues where such procedures are not available. (3) Collect basic information for evaluating herbicide residue problems as degradation, mechanism of detoxification and deposition.  
Agr.Chem. 284 (See W-45 in Part 7, Section d) Coop. USDA
- Oreg.      Use of Isotopes in Studying Fundamental Agricultural and Biological Problems. I. The Mode of Action of 2,4-Dichlorophenoxyacetic Acid. To study the process by which 2,4-D exerts its selective herbicidal effect on some noxious plants.  
Agr. Chem. 141-I Coop. AEC

- Oreg. Properties of Herbicides Influencing Their Physiological Effectiveness in Weed Control. (1) Measure physical and chemical properties of herbicides that influence their effectiveness in weed control and evaluate these properties in plants. (2) Study reactions of herbicides and interaction with factors of environment as they influence herbicidal effectiveness. (3) Evaluate problem of formulation of herbicides in relation to their effectiveness. (4) Evaluate molecular modifications as a factor in herbicide activity.  
Agr. Chem. 349 (W-11) Coop. USDA
- Pa. Influence of Environmental Factors on the Effectiveness of Herbicides. To determine (1) influence of soil moisture on effectiveness of 2,4-D, CMU, etc. as pre-emergence herbicides on corn; (2) influence of soil organic matter, porosity, and fertilizer level on effectiveness of 2,4-D as pre-emergence herbicide on corn; (3) influence of moisture, competition, light, and temperatures on 2,4-D injury and weed control; (4) influence of nutrient concentration, N, and K balance on 2,4-D injury in greenhouse; and (5) physiological, morphological and other changes in plants where injury has been induced by above treatments.  
Agron., Bot., Engin., Pl. Path. 1229 (NE-12)
- Pa. Microbiological Studies in Weed Control. Learn reciprocal relationships of various weed and brush control chemicals and soil microorganisms.  
Bact. 1346-C
- P. R. Virus Diseases of Weeds. To determine (1) identity of viruses attacking weeds in Puerto Rico; (2) means of propagation of viruses of weeds; and (3) in cases where transmission of virus is by insect vectors, to identify insect vectors and relation between vectors and viruses; (4) host range of weed viruses in order to determine if plants of economic value are susceptible; and (5) control methods if plants of economic value are affected by weed viruses.  
Pl. Path. 63
- S. C. Use of Growth Regulating Substances for Weed Control. To investigate and evaluate possibilities of new herbicides for selective control of annual and perennial weeds and grasses.  
Bot., Agr. Engin. 100
- Tenn. Movement and Persistence of Herbicides in the Soil. To determine (1) persistence of certain herbicides in soil; (2) lateral diffusion of certain herbicides in soil; and (3) how these properties vary with changes in soil moisture, temperature or soil type.  
Agron. 45 (S-18)
- Tenn. Effect of Certain Insecticides and Herbicides upon the Biochemical Activities of the Soil and upon Plant Growth. (1) Establish safe limits of concentration of newer types of insecticides that may be incorporated into the soil without adversely affecting microbiological activities in the soil. (2) Learn lethal concentration of insecticides for plant growth; and (3) duration of possible injurious effects from overdoses.  
Agron. 54



- Utah      Effect of Environmental Factors on the Susceptibility of Creeping Perennial Weeds to Herbicides. (1) Learn susceptibility of creeping perennial weeds to herbicides as influenced by soil moisture, soil fertility, soluble salts, cultivation before and after herbicide treatments, etc. (2) Increase efficiency of herbicides.  
Agron. 498 (W-11)
- Va.      The Effect of Herbicides on Crop Plants and Weeds. To determine (1) effects of herbicides on food value, texture, flavor, enzymes, vitamins, and other quality measures of crop plants and (2) mode of entry and processes involved in killing action of herbicides on weeds and crops.  
Pl. Path., Physiol. 93903 (S-18)
- Wash.      Perennial Weed Control. To (1) Learn physiological characteristics and ecological relations of creeping perennial weeds as related to herbicidal effectiveness; (2) learn factors affecting entrance and translocation of certain herbicides, and learn physiologic changes induced in plants; (3) relate results of physiological studies to methods of control and make control trials; (4) test new chemicals which show promise for use in controlling weeds.  
Agron. 1120
- Wash.      Effect of Herbicides on Root Morphogenesis with Special Reference to Meristems and Vascular Tissues. Learn effect of herbicides on morphogenesis of roots in relation to herbicidal effectiveness; note changes occurring in meristems and vascular tissues.  
Agron. 1372 (W-11)
- W. Va.      Factors Affecting the Herbicidal Activity of Some Chemicals Applied to the Soil Surface. To study (1) fundamental relations between soil characteristics on the effectiveness of various herbicides as measured by germination and seedling vigor in the greenhouse; (2) effective rate of application of herbicide under controlled conditions of moisture and pH; (3) influence of above soil characteristics as they affect herbicidal activity of 2,4-D, dinitro's, etc.; and (4) persistence of herbicidal activity under controlled soil moisture conditions.  
Agron., Genetics 76 (NE-12)
- Wis.      Control of Vegetative Bud Activity in Weedy Plants. To determine more exactly the mechanisms regulating vegetative bud activity in weedy plants and develop methods for controlling weeds by this means.  
Agron. 56 (NC-10)

## WEED CONTROL

## Horticultural Crops

- Alaska      Weed Control of Horticultural Crops. To determine which chemicals and cultural practices or combination thereof are best suited to the control of weeds and their influence on productivity, winter survival, and quality of such crops as lettuce, cabbage, beets, and strawberries.  
Hort. 9
- Alaska      Effect of Mulching on Survival, Productivity, and Weed Control Practices of Strawberries. To determine (1) effect of mulching and weed control practices on overwintering and productivity of strawberries; (2) if good commercial varieties can be grown successfully when cultured in a manner similar to that used by commercial Stateside growers; and (3) to provide a means of developing strawberry industry with existing varieties until such time as a better variety is released from the hybridizing program.  
Hort. 11
- Ariz.      Control of Weeds in Lettuce and Cantaloupes. To (1) screen and evaluate existing herbicides as well as those which may be developed during the time the project is in progress; and (2) make detailed evaluation of herbicides found to be effective as to rate of application, time of application in relation to crop seeding and growth, concentration, and method of application.  
Hort. 374 Coop. ARS
- Del.      Control of Weeds in Horticultural Crops with Emphasis on Herbicides Applied Prior to Weed Emergence. (1) Screen new chemicals as possible pre-emergence herbicides. (2) Evaluate herbicide-soil incorporation and irrigation prior to and following herbicide application as means of making pre-emergence weed control more effective. (3) Learn deleterious affect of repeated application of chlorophenyl dimethylurea on asparagus field over a number of years.  
Hort. 11-H
- Mass.      Control of Weeds in Nursery by Chemical Sprays. Find chemicals or combinations of chemicals that will control weeds without injury to ornamental plants.  
Landsc. Arch. 84
- Mass.      Weed Control in Vegetable Crops. To develop more efficient methods for the control of weeds in vegetable crops through the use of various herbicides and/or mechanical means.  
Hort. 87
- Mass.      Weed Control in Cranberries. To discover best means for controlling or eradicating weeds among cranberry vines.  
Cranberry 116

- Minn.      Weed Control in Vegetable Crops. To improve quality and to reduce production costs of vegetables grown for processing, with special emphasis on weed control.  
Hort. 2125
- Mo.      Control of Weeds in Horticultural Crops. (1) Learn weed control effectiveness and specificity of new herbicidal chemicals being produced by industry and the tolerance of the various horticultural crops to these materials. (2) Study translocation of herbicides by radioisotope technique. (3) Learn value of mulching materials in weed control and crop production.  
Hort. 146
- Nebr.      Improvement of Safflower by Development of Better Cultural Methods and Superior Varieties. (1) Learn cultural practices for safflower production under irrigated and dryland conditions. (2) Study chemical and cultural methods of weed control. (3) Cooperate with existing safflower varietal improvement program.  
Agron. 544 Coop. ARS
- N. Y.      Herbicide Residues in or on Vegetable Crops. To determine (1) (Cornell) residues remaining on or in vegetable crops resulting from the use of herbicides; (2) residues in or on potatoes, dry beans, and other vegetable crops, and in soil resulting from use of vine-killers, sprout inhibitors, defoliant, and other plant regulators.  
Veg. Crops 190 (See NE-36 in Part 7, Section d)
- N. Y.      Onion Weed Control - Muck. Reduce the cost of weed control (Cornell) in muck grown onions by the judicious use of chemical weed sprays and dusts.  
Veg. Crops 209
- N. Y.      Control of Weeds and Vine Growth of Potatoes with Chemicals. (Cornell) Control weeds in potatoes more adequately with chemicals and find better methods of killing or slowly maturing of potato vines before harvest.  
Veg. Crops 217
- Ohio      Eradication or Control of Weeds and Other Undesired Plants.  
II. Chemical and Cultural Weed Control Studies with Horticultural Crops. To determine (1) if any available weed control chemicals can be used in conjunction with regular cultural practices to solve some major weed problems associated with production of horticultural crops; (2) kind of chemical best suited for use with a specific crop; (3) optimum form of chemical, time, rate and method of application for each crop under field conditions; and (4) through replicated field plot experiments, the value of these treatments with regard to weed control, and their effect on qualitative and quantitative yields of the crop plant.  
Hort. 71-2 (NC-10)



- Pa.      Weed Control in Ornamental Plantings. Learn: (1) most satisfactory methods, materials, and techniques for control or eradication of weeds and other undesirable plant growth in ornamental plantings; (2) tolerances of ornamental plants to various concentrations and kinds of herbicides.  
Hort. 1346-E
- Pa.      Weed Control in Vegetable Crops. Learn: (1) most satisfactory methods, materials, and techniques for control or eradication of weeds and other undesirable plants in vegetable crops; (2) effects of various concentrations of herbicides on vegetable crops; (3) effect of climatic factors, soil moisture and stage of growth of crops and weeds on the action of the herbicide.  
Hort. 1346-F
- R. I.      Potato Culture.--a. Potato Breeding and Testing. b. Pre-Harvest Weed Control in Potatoes. c. Sod Crops for Use in Crop Rotations with Potatoes. To (1) test new potato varieties and seedlings as they are developed in natural breeding program, in order to determine value for local conditions; (2) determine relative value of different chemical preparations for use as a spray on weedy potato fields, just previous to harvest, in order to kill weeds and potato vines; and (3) test comparative value of timothy, red top, timothy and red top, timothy and alsike, timothy and red clover, and red top and alsike as sod crops to be grown in a 4-year rotation of 2 years of potatoes and 2 years of sod crops.  
Agron., Pl. Path. 201
- S. C.      A Study of the Effect of Herbicides on Weeds in Some Ornamental Nursery Stock. To learn (1) herbicides most effective in weed control and, (2) which are least injurious to nursery stock.  
Bot., Hort. 90
- Utah      Control of Weeds in Horticultural Crops. (1) Screen promising herbicides for weed control in vegetable, fruit, flower, and vegetable seed crops. (2) Learn effect of the more promising herbicides on yield and quality of horticultural crops. (3) Test and develop equipment adaptable to applying herbicides to small acreage.  
Agron., Hort. 505
- W. Va.      Effects of Herbicides on Tree Fruits and Small Fruits. To determine whether herbicides that are recommended for weed control in orchards and small fruit plantings can be (1) safely used yearly (or more frequently, if specified by recommendations) for several seasons, (2) whether orchardist or home owner is likely to suffer injury to his plants or fruit if excessive rates are applied.  
Hort. 116

#### Forage Crops

- Ariz.      Shrub Invasion-Forage Production Inter-Relations on Arizona Rangelands. Learn site characteristics affecting potential shrub invasion and forage production.  
Agron., Range Management 292 Coop. FS



- Calif.      Control of Herbaceous Range Weeds. To learn how to control herbaceous weeds in the areas they now occupy, how to prevent their further spread, and what factors and combinations determine the actual and potential areas of distribution.  
Agron., Bot. 1635
- Colo.      Weeds Detrimental to the Agricultural and Livestock Industries and Other Interests of the State. To (1) increase effectiveness and practicability of controlling weeds under wide range of environmental conditions and types of farming and ranching common to the state of Colorado through improving methods now in use, evaluating promising methods, and developing new methods through coordinated, fundamental field research, and (2) determine the location, extent, and importance of those weeds and poisonous plants that constitute or threaten to constitute a serious problem in the state.  
Agron., Anim. Husb. 81
- Hawaii      Methods in, and Evaluation of, Range Improvement Practices in the Humid Lowland Pastures of Hawaii. To define and measure appropriate practices of brush control, renovation of sward, fertilization and reseeding in pastures of Hawaii in terms of components of pasture sward, forage yield, animal carrying capacity, costs, and returns.  
Agron. 129 (See W-25 in Part 10)
- Idaho      The Control and Eradication of Weeds on Pasture and Range Lands. To study efficiency of chemical, cultural, biological, and competitive methods of seed control. To learn anatomical, morphological, and physiological characteristics of pasture and range weeds. Specific weeds as the following are being studied: goatweed, Medusa head rye, larkspur, lupine, rabbit brush, etc.  
Agron., Agr. Econ., Ent. 257 Coop. ARS
- Md.      Weed Control in Legumes. To (1) further evaluate selective herbicides that may be used for control of various weeds in legumes; (2) study importance of fertilizer rates and placement and seed rates and placement in establishment of legumes with a minimum of weed competition; and (3) study interrelation of alfalfa varieties, rate of fertilization, use of chemical herbicides, and insect control practices.  
Agron., Ent. B-58-c Coop. ARS
- Mass.      Control of Forage Crop Weeds in Massachusetts. To (1) control weeds in new seedings of grass-legume mixtures; (2) control chickweed in alfalfa; (3) control perennial weeds in grasslands; and (4) use herbicides in control of weeds and weed grasses in renovation of old sods.  
Agron. 7

- Miss. Control of Perennial Weeds, Brush Species, and Other Weeds in Pastures. A. Pasture Investigations: To (1) determine chemical control procedures for undesirable species in spring, summer and winter pastures; and (2) study the use of chemicals in the renovation and establishment of pastures. B. Perennial weed study: To (1) develop methods of controlling certain specific perennials, such as Texas cedar, (Eupatorium capillifolium), horse nettle (Solanum carolinense), wild rose (Rosa bracteata), trumpet vine (Campsis radicans), and other vine species in pastures; and (2) study chemical methods of controlling perennial and annual weeds along fence rows, ditch banks and rights-of-way, which might supply a source of infestation for adjacent pastures; and C. Studies in Brush Control: To (1) develop chemical procedures for deadening brush species in areas preparatory to utilization for cropping or pastures; and (2) study chemical methods of controlling brush species in old and new pastures, ditch banks, fence rows, canals, and rights-of-way.  
Pl. Path. HL-17 Coop. USDA
- Mo. Research in the Control of Weeds.--I. Control of Weeds (Including Woody Plants) in Pastures and Meadows, and II. Control of Weeds in Corn, Cotton, Cereals, Soybeans. To reduce the damages to pastures, corn, cotton, cereals, and soybeans, caused by weeds in their many and varied ill effects.  
Agr. Engin., Field Crops, For. 156 I & II Coop. USDA
- Nebr. Pasture Weed Control. (1) Learn degree of susceptibility of desirable grassland species and weeds to application of 2,4-D in pastures, effectiveness of mowing for control of broadleaved weeds and weedy grasses; forage production as affected by weed control and grazing intensity. (2) Compare effectiveness of mowing and 2 formulations of 2,4-D for control of buckbrush at different dates of application. (3) Compare several formulations of 2,4-D with and without additives to stimulate translocation, dichlorophenoxybutric acid materials, trichlorobenzoic acid and amizol for ironweed control. (4) Study control of hairy chess in pastures using p-chlorophenyl dimethyl urea, phenyldimethylurea and dichloropropionic acid. (5) Study control effect from dichloropropionic acid, trichloropropionic acid, and trichloroacetic acid on weedy grasses on establishment of spring seeded alfalfa.  
Agron. 522 Coop. ARS
- Nev. The Control of Certain Weeds in Native Meadows and Pastures. To learn enough of ecology and responses of herbicides and mechanical treatment of certain meadow weeds to be able to describe dependable, feasible control measures, studying foxtail barley, blue flag, and arrowgrass first, in that order.  
Agron., Range Management 99 (W-11)
- N. Y. Weed Control in Forage and Pasture Crops. Learn by lab, (Cornell) greenhouse, and field studies, safe and economic methods of weed control in new and established stands of forage crops and pastures for sound farmer recommendations.  
Agron. 50-2 Coop. ARS



N. Y. Herbicide Residue Studies in and/or on Forage Crops and in  
(Cornell) Products from Animals Fed These Forages. Learn residues of  
herbicides in or on forage crops from foliage and soil applications,  
and in animal products produced from these forage crops.

Agron. 184 (See NE-36 in Part 7, Section d)

S. C. The Tolerance of Weeds and Pasture Grasses for Various Herbi-  
cides, with Especial Reference to Horsenettle (*Solanum carolinense*)  
and Sandspur (*Cenchrus Spp.*). Develop chemical control for: sand-  
spur in sandy soil pastures, lawns and parkways by means of pas-  
ture plot experiments and by herbicidal applications to greenhouse-  
grown sandspur plants; horsenettle in permanent summer pastures by  
suitable pasture plot experiments and by means of greenhouse ex-  
periments in which age at which horsenettle tissues are most re-  
sponsive to herbicides.

Bot. 86 (S-18)

Texas Control of Weeds and Improvement of Grasses on Ranges. To  
(1) assemble and incorporate all pertinent data obtained to date  
on studies under former projects 415 and 389; (2) learn relative  
value of certain range management practices for bitterweed control;  
(3) learn effect of certain range management practices on native  
vegetation and production of livestock and livestock products; (4)  
learn desirability of deferred rotation grazing as compared with  
continuous grazing; and (5) learn value of mechanical and chemical  
methods for bitterweed control.

Anim. Husb., Range and For. 902

Va. Control of Undesirable Plant Species in Pastures and Other  
Non-Crop Areas. To develop (1) safe and economical chemical  
methods for removing undesirable annual and perennial weeds from  
pastures and lawns, (2) methods for killing unwanted woody plants  
growing in wood lots, fence rows and rights-of-way.

Pl. Path., Physiol. 86068

#### Cereal Crops

Ark. Weed Control in Rice Production. (1) Develop either a  
cultural, chemical, or a combination method for controlling  
*Echinochloa crusgalli*. (2) Evaluate herbicides for controlling  
*Sesbania macrocarpa*, *Aeschynomene virginica*, *Heteranther limosa*  
and other weeds infesting rice fields. (3) Study tolerance of  
rice to various herbicides. (5) Study methods of controlling  
weeds infesting rice field canals.

Agron., Pl. Path. 419

Ga. The Use of Chemicals for Weed Control and Defoliation of Crop  
Plants. To determine (1) most economical method to control weeds  
in cultivated crops; (2) most satisfactory and economical method  
to control weeds in small grain and sod crops; and (3) effective-  
ness of materials used for defoliation of cotton and other crops  
and what effect chemicals have on quality and quantity of crops  
harvested.

Agron. Agr. Engin. 32 Coop. ARS

- Ky.            Chemical and Cultural Control of Weeds in Agronomic Crops.  
 (1) Develop practical and economical measures for control of weeds of agronomic crops in state through use of chemical herbicides, cultural techniques, and combinations of chemical and cultural measures. (2) Study effect of chemical herbicides on crop and weedy plants, and biological factors affecting weeds.  
 Agron. 164
- Va.            Chemical Weed Control in Corn and Alfalfa. Develop safe and economical chemical control of various types of weeds at different stages of growth of alfalfa and corn.  
 Agron. 86073
- W. Va.        Weed Control in Corn. (1) Learn and demonstrate effective methods of weed control in corn under state conditions with emphasis on grass control. (2) Study chemical weed control as related to type of herbicide, rate and time of application on corn. (3) Study factors influencing germination and viability of weed seeds so that plots under weed control may be seeded with weeds with assurance of a stand. (4) Learn economic losses caused by weeds and cost of weed control in corn.  
 Agron., Genetics 52

#### Field Crops

- Ark.            Physiological Effects of Selected Herbicides on Cotton, Soybeans, and Noxious Weeds. Establish maximal limits of certain herbicides for cotton and soybeans, and minimal requirements for control of noxious weeds, as may be influenced by age of plants and environmental conditions. Learn degree to which varieties within a given species differ in their tolerance to any given herbicide and learn cause of differences. Investigate mechanism by which herbicides kill plants.  
 Agron. 408 (S-18)
- Calif.        Weed Control Associated with Cotton Production. (1) Develop a program of controlling annual and perennial weeds in cotton fields and a control for similar weeds in nearby areas that act as seed reservoirs. (2) Lower production costs, increase grades of cotton, increase yields of cotton in some instances, reduce maintenance costs along water ways, fence lines, etc., adjacent to cotton land.  
 Bot. 1568 Coop. USDA
- Del.            Chemical Control of Weeds in Soybeans. Evaluate herbicides for development of satisfactory and economical weed control practices in soybeans with emphasis on pre-emergence applications.  
 Agron., Agr. Engin. 36A



- Minn. Weed Control with Particular Relation to Field Crops.--16.  
Management of Sod Crops for Weed Control. (1) To study chemical and cultural weed control in legumes and a legume-grass mixture grown under provisions of Soil Bank.  
 Agron., Pl. Genetics 1301-16
- Mo. Weed Control and Crop Defoliation in Cotton Production.  
 Discover more effective and more efficient (1) chemical and cultural methods of weed control in relation to cotton production; (2) methods of defoliating cotton.  
 Field Crops 332
- Mont. The Control of Annual and Biennial Weeds in Field Crops.  
 To (1) control annual and biennial weeds in grain crops by use of selective herbicides; (2) control annual weeds in row crops such as beans, peas, and sugar beets; and (3) evaluate new herbicides for control of annual and biennial weeds.  
 Agron., Soils 881 Coop. USDI-Bureau of Reclamation
- Nev. Cotton Weed Control in Southern Nevada. Test weed control measures developed in other areas for Nevada conditions, find economical control for Johnson grass and perennial morning glory.  
 Agron., Range Mgt. 15
- N. Y. Weed Control in Field Corn and Small Grains. Learn by lab., (Cornell) greenhouse and field studies safe and economic recommendations for control of weeds in field corn and small grains.  
 Agron. 50-1 Coop. ARS
- N. Y. Control of Perennial Weeds in Field and Forage Crops. (1) (Cornell) Screen commercially available and experimental herbicides on row and forage crops and perennial weeds associated with crops and study effects of cutting and spraying on crops involved. (2) Learn by field evaluation how best to utilize commercially available and new experimental herbicides for control of perennial weeds in row and forage crops.  
 Agron. 185 Coop. ARS
- Ohio Eradication or Control of Weeds and Other Undersired Plants.  
I. The Chemical and Cultural Control of Weeds in Field Crops.  
 To study (1) use and effectiveness of chemicals alone and with tillage in weed eradication compared with tillage alone and rates, dates, and methods of application of chemicals for maximum effectiveness on weeds and minimum injury to crops; (2) effects of herbicides on seed germination, composition, palatability, and other important properties of crop; (3) reaction of different varieties of crops to herbicides; (4) to devise specific systems of treatment for major noxious weeds of the state, using chemical, mechanical, and crop competition methods or combinations of them; and (5) to study relation of crop rotations to weed control.  
 Agron. 71-1 (NC-10)

Va. Weed Control in Field Crops. Develop principles and practices for effective and efficient chemical weed control in peanuts, soybeans, small grain, forage seedling establishment and maintenance, cotton, tobacco seed beds, and field grown tobacco.

Pl. Path., Physiol. 86067

Wyo. Use of Herbicides for Control of Weeds in Sugar Beets. (2)  
Learn effect of chemicals upon yield and composition of beets. (3)  
Devise and develop a band method for field application of herbicides.  
Agron. 608

#### Lawns and Turf

Ohio Weed Control in Turf. To grow turf free of weeds by the use of chemicals and/or good maintenance practices.  
Agron., Ent. 71-6 (NC-10)

#### Ponds and Ditches

Ala. Chemical Control of Weeds in Ponds. To test (1) effectiveness of commercial and experimental herbicides and algacides on common pond weeds; (2) toxicity of herbicides and algacides to fish and fish food organisms, and their effects on fish production, plankton and bottom organism production; (3) effects of herbicides or algacides on flavor of fish.  
Ent., Zool. 427

Ariz. The Control of Weeds on Irrigated Lands. To determine the most effective and economic methods of weed control on the irrigated lands of Arizona.  
Agron. and Range Mgt. 261 Coop. ARS

N. Mex. Chemical Weed Control on Cropland, Irrigation Systems, and Water Courses. To (1) determine germination requirements and longevity of weed seeds under New Mexico conditions; (2) utilize information gained under objective (1) to determine the influence of temperature, moisture, and soil conditions on the action of herbicides on germinating seedlings; (3) further these, evaluate environmental variables as they affect the action of herbicides on emerged seedlings; (4) relate differences in enzyme systems and other plant constituents to the selective action of herbicides on resistant and tolerant strains of perennial weeds of the same species; (5) utilize knowledge of crop and weed ecology to pre-disposed infesting weeds to the selective action of herbicides; (6) determine the toxicity of growth regulator herbicides to salt cedar, and the variables affecting their action; and (7) evaluate in screening tests the effects of new herbicides on the growth and quality of field and horticultural crops and on the weeds common to these crops.  
Agron. 46

- S. C.        Maintenance of Drainage Channels. To (1) test, modify or develop light machinery for removing silt and vegetation from open channels; (2) determine effective and economical methods for controlling aquatic plant growth in drainage channels, with major attention to chemicals and equipment for applying chemicals; and (3) determine effectiveness of selected grasses on ditch side slopes in reducing growth of undesirable plants, and in reducing erosion of the side slopes.  
Agr. Engin. 66

#### Poisonous Plants

- Tex.        Distribution, Abundance, Economic Importance and Control of Poisonous Plants on Range Lands. To (1) obtain information on distribution and abundance of plant species toxic to range livestock; (2) secure and compile data on losses of livestock on basis of weed species, season and area involved; (3) secure for each species data on nomenclature, description, distribution, sites of infection, toxic nature, etc. and methods of control; (4) determine toxic species if and when losses warrant, by field investigations and feeding experimentation; and (5) determine by field experiments, quantitative and seasonal control data on chemical control of toxic species in problem areas.  
Range and For. 608

#### Brush

- Ariz.        Control of Noxious Shrubs on Southwestern Ranges. Study: (1) influence of temperature, humidity, rainfall, and soil moisture on effectiveness of mechanical methods of controlling cholla and pricklypear cacti; (2) conditions and factors resulting in variable kills of burroweed by 2,4-D and develop a consistent and effective method of control. Learn: (3) factors affecting control of turbinella oak by herbicides following burning; (4) factors influencing control of creosotebush, whitethorn, and tarbush with herbicides.  
Agron., Range Mgt. 285 Coop. ARS, FS

- Ark.        Herbicidal Brush and Weed Control for Range Development and Pasture Improvement. To learn (1) effect of herbicides on woody growth and pasture weeds, (2) succession of plants following herbicidal removal of brush and small trees, (3) if additional operations other than removal by herbicides are needed to improve treated areas.  
Agron. 404



- Storrs  
(Conn.) The Control of Growth of Woody Plants by Photoperiodic Treatment. Provide a program whereby recommendations can be made to growers on how to apply photoperiodic treatments in production of trees and shrubs most effectively by: (1) Learning which are responsible to changes in day length and learn morphological nature of their response. (2) Learning critical intensity and duration of light that would prevent induction of a dormant condition. (3) Learning date when plants should be removed from long day treatment to allow sufficient time to permit hardening of tissues in preparation for winter; and (4) effect of day length on rooting of cuttings and on germination of seed.  
Pl. Sci. 268
- Colo. Improving Sagebrush Lands to Obtain Maximum Range Live-stock Production.--B. Eradication Phase. To determine most practical and economical methods to improve sagebrush rangelands of low productivity by using the following better range management practices singly or in combinations: a. use of scientific grazing systems and other improved livestock management practices, b. eradication of sagebrush, and c. artificial reseeding of both abandoned croplands and treated sagebrush lands to adapted forage plants.  
For. and Range Mgt. 65b
- Mass. Forest Stand Improvement by the Use of Chemicals to Kill Inferior Trees. To test use of various chemicals to kill weed trees in Massachusetts forests.  
For. 73
- N. H. The Effects on Vegetation of Weed-Control Measures Applied to Woody Plant Areas. To determine (1) in areas such as public utility lines where extensive work is being carried on in New Hampshire, the qualitative and quantitative effects of relatively non-selective foliar spraying on the ecological successions of desirable plants and weeds; and (2) effects on vegetational successions of currently used weed control practices in blueberry pastures.  
Bot. 68
- N. Y.  
(Cornell) Woody Brush Control. To determine the best methods of application, volumes and concentrations to use, and effect of dormant treatment in brush poisoning with the selective, hormone weed killers.  
Conserv. 81-E
- Wyo. Effect of Big Sagebrush Control upon the Composition, Density and Production of Native Forage Species. To (1) determine effect of big sagebrush control upon density and composition of sagebrush-grass type rangeland; and (2) study effect of various amounts of sagebrush eradication upon production of native forage species.  
Agron. 484 (W-11)

## Miscellaneous Crops and Weeds

Ga.

Control of Noxious Perennial Weeds by Chemical and Cultural Methods. (1) Screen chemicals for the control of nutgrass, Johnson grass, and wild onions under greenhouse conditions. (2) Test chemicals under field conditions both when used alone and in combination with tillage operations.

Agron. 33

Iowa

Control of Weeds in Economic Crops. To (1) improve methods of controlling weeds by developing herbicides for use alone and in conjunction with other cultural practices and to adapt these methods to crop production techniques; (2) search for and test improved selective and general herbicides; (3) learn influence of environmental conditions on selective action of herbicides on major crops and weeds; (4) evaluate response of major crop varieties and breeding stocks to established herbicides such as 2,4-D; (5) learn most effective method of using more promising herbicides, i.e. time of application, preferred concentration and dosage, and site of application; (6) secure fundamental engineering information leading to development and improvement of equipment and methods for controlling weeds; and (7) study development of crops and weeds as influenced by the several factors of environment, weed control practices, and crop production methods.

Agron., Agr. Engin., Bot., Hort., Pl. Path. 1121(NC-10) Coop.USDA

Maine

Weed Control in Maine Crops. To devise more effective chemical weed control practices in Maine crops.

Agron. 14

Mont.

The Use of Herbicides for the Control and Eradication of Leafy Spurge and Poisonous Weeds. To develop more effective methods of controlling leafy spurge (*Euphorbia esula*) in cultivated and non-cultivated land, and study methods of controlling poisonous plants with herbicides.

Agron. 151, M.S. 952

Nebr.

Eradication and Control of Weeds. To (1) establish principles and develop methods to eradicate or economically control annual, biennial, and perennial weeds on fields, pastures, roadsides, irrigation ditches and lawns; (2) investigate new and old herbicides to supplement present knowledge of cultural and chemical weed control methods; (3) determine effects of weed control measures on yield, quality, and germination of crops produced; (4) compare cultural and other weed control practices alone, chemical treatments alone, and combinations of these methods; and (5) study influence of environmental factors on results obtained from weed control measures.

Agron. 216 (NC-10)

- Nebr.      Development of Weed Control Principles and Methods for Western Nebraska Agriculture. (1) Establish principles and develop methods for control or eradication of: bur ragweed (*Franseria tomentosa*) and (*F. discolor*); field bindweed (*Convolvulus arvensis*); leafy spurge (*Euphorbia esula*); and Russian knapweed (*Centaurea repens*). (2) Study and devise economical methods for control of undesirable vegetation associated with irrigation and irrigated crops, (3) establish rotation studies for testing and comparing various crop sequences, tillage methods, and chemical treatments alone and in combination for their value in weed control on fallow land.  
Agron. 516 Coop. ARS
- N. Y.      Control of Nutgrass in Agricultural Regions. To control (Cornell) nutgrass with chemicals to make it possible to again grow row crops or to continue to grow them with less reduction in yields and less cost of weed control.  
Veg. Crops 165
- N. C.      Weed Control in Corn, Sorghum, Tobacco, Small Grain, Horticultural Crops, and the Specific Control of Bermuda Grass and Wild Garlic. To develop (1) field production practices to better control weeds in corn, sorghum, tobacco, small grain, and horticultural crops, and better control methods for Bermuda grass and wild garlic; and (2) basic principles and practices involved in satisfactory farm use of above methods, to learn facts needed to understand failures, if and when they occur, and methods of preventing such failures.  
Farm Crops 59
- N. C.      The Development of Principles and Practices for the Control of Weeds in Cotton, Peanuts, Soybeans, Forage Crops, Turf and for the Control of Nutsedge, Johnson Grass and Woody Plants. To develop (1) for North Carolina reliable, practical and economical practices for solution of above weed problems; and (2) principles of weed control particularly as related to weed control practices in North Carolina.  
Agron., Field Crops 61
- N. Dak.      Control of Quackgrass, Field Bindweed, Leafy Spurge, Perennial Sow Thistle and Canada Thistle by Means of Competitive Crops Supplemented by Selective Herbicides. To determine the ability of various grasses to suppress, control or eradicate serious perennial weeds of North Dakota.  
Agron., Bot. 9-1 Coop. USDA
- Okla.      Control of Weeds in Cultivated Crops. Develop more efficient methods for control of annual weeds in cultivated crops. (2) Learn effect of various herbicides on growth, yield and quality of field crops. (3) Develop more efficient and economical methods for control of perennial noxious weeds.  
Agron. 933 (NC-10)



- R. I. Factors Affecting the Control of Nutgrass with Substituted Ureas, Alone, or in Combination with Other Herbicides. To (1) determine to what extent soil pH, fertility and moisture influence time needed by substituted ureas to eradicate nutgrass; (2) find how these factors affect duration of residual toxicity; and (3) discover if other herbicides such as phenyl mercurials will enhance effectiveness of the substituted ureas.  
Agron., Agr. Chem. 204 (NE-12)
- R. I. Water Soluble Mercurials and Other Chemicals for Crabgrass Control. To determine a satisfactory chemical method of crabgrass control.  
Agron., Ent., Pl. Path. 209
- R. I. Evaluation of Chemicals and Other Means for Controlling Weeds. To determine (1) effectiveness of pre- and post-emergence treatments for weed control, and (2) fundamental effects of herbicides and other means on weeds and crops.  
Agron., Hort. 211
- S. Dak. Weeds and Weed Control. Develop and improve cultural methods, chemical methods and a combination of 2 methods for controlling weeds on cultivated land, grassland, and other uncultivated land; investigate new chemicals that may have herbicidal properties; (2) study physiological, morphological, and agronomic responses of weeds and agronomic crops to herbicides as: factors affecting crop yield and biochemical response of weeds. (3) Learn differences in growth habits, means of propagation and physiological activity of weeds as: activity of vegetative buds; factors influencing development, maturation, and germination of weed seeds. (4) Cooperate with other experiment stations and USDA.  
Agron. 32 (NC-10)
- Tenn. Chemical Weed Control. (1) Develop satisfactory methods for control of weeds in row crops and close growing crops, control of specific weeds including brush and trees, and soil sterilization where control of all vegetation is desired. (2) Evaluate equipment and methods for herbicide application.  
Agron., Agr. Engin., Hort. 32
- Texas Control of Field Bindweed (*Convolvulus arvensis*) and Blueweed (*Helianthus ciliaris*) and Similar Broadleaf Weeds in the Sub-humid Farming Areas of Texas. Develop and improve chemical and cultural practices for efficient and economical control of sub-humid perennial broadleaf weeds under a range of climatic and cropping conditions.  
Agron. 686
- Texas Control of Johnsongrass and Annual Grasses in Texas. (1) Perfect current methods and develop more effective and economical new practices for controlling established Johnsongrass. (2) Develop more acceptable methods for controlling Johnsongrass and annual grass seedlings under various agricultural and other situations in the State.  
Agron. 794 Coop. USDA

Texas      Control of Perennial Broadleaf Weeds in Southern Crops. Learn susceptible stages of growth and suitable environmental conditions and methods of treatment for control of perennial broadleaf weeds, particularly vines persisting in crops.

Agron. 915B (S-18) Coop. ARS

Utah      Control and Eradication of Weeds Through Management Practices and Herbicides. To determine (1) effects of various crops in combination with different management practices and herbicides as related to crop yields and control of creeping perennial weeds; (2) effect of herbicides in control of annual weeds in small grains and certain other crops as related to crop yields and weed control; (3) duration of time that winter rye and wild oats seed will remain in soil and retain their viability and to devise methods for the control of rye in winter wheat and wild oats in small grains and other crops; (4) effects of various factors such as moisture, commercial fertilizer, organic matter, soil texture, and salt on susceptibility of weeds to various herbicides; (5) if it is possible to devise a technique to replace perennial weedy vegetation with a more desirable type of vegetation on non tillable land by the aid of herbicides, other devices, and reseeding with desirable species; and (6) to continue present service, to college and station personnel, of spraying for control of noxious weeds on college and station property.

Agron. 159 Coop. ARS

Utah      Control of Dodder in Alfalfa Seed Production. (1) Devise methods of controlling dodder as related to alfalfa seed, (2) study nutrition and physiology of dodder and its host plant relations as a basis for devising control methods.

Agron. 481

Wyo.      Chemical Control of Perennial Farm and Range Weeds. (1) Devise and evaluate methods for control of farm and range weeds. (2) Study physiological response of plants to herbicidal applications. (3) Learn effect of chemical treatment upon soil-plant relations.

Agron. 607

#### TAXONOMY, ECOLOGY AND LIFE HISTORY OF WEEDS

Ariz.      Investigation of Phenotypic Variations in Germination, Plant Establishment, and Early Seedling Growth in Relation to the Control of *Quercus turbinella*, Greene. (1) Obtain information on genetic variation in woody plants, using seeds and seedlings of same species from different sources of origin. (2) Apply knowledge of environmental factors influencing genetic-physiological germination, plant establishment, and plant growth responses to shrub control.

Agron., Range Mgt. 454 (W-11) Coop. ARS, FS



Idaho

Studies on the Ecology and Propagation of St. Johnswort Insects in Idaho. To (1) determine if 3 recently introduced species of St. Johnswort feeding insects can become established in Idaho; (2) conduct ecological and life history studies on all introduced St. Johnswort feeding insects; and (3) determine role of each St. Johnswort insect in control of this weed in Idaho.

Ent. 231 Coop. ARS, FS

Ky.

Yield, Seasonal Activity, and Persistence in the Soil of Different Types of Bulbs of Wild Garlic, *Allium vineale*, L., in the Northern Range of its Adaptation. To learn (1) relative yield in numbers of different types of reproductive bulbs of wild garlic, (2) seasonal rate of germination and time when new dormant bulbs in soil.

Agron. 173 (S-18)

Minn.

Ecology and Control of Brush and Other Forest Vegetation. (1) Study life history and successional ecology of major brush species basic to development of control measures. (2) Develop techniques for controlling forest vegetation leading to desired management goals for forestry, wildlife, or agricultural purposes. (3) Predict trends in forest succession as an aid in planning use of forest and wildlife resources.

For. 1918 Coop. ARS

Minn.

Weed Studies. 1. Taxonomy of Weeds. 2. Ecology and Physiology of Weeds. To (1) elucidate pertinent phases of the weed problem, (2) formulate control measures, (3) evaluate control measures, and (4) make recommendations through proper channels to put findings into practice.

Agron., Bot., For., Hort., Pl. Path. 2201-1 & 2

Miss.

Studies of the Physiology and Life Cycles of Weeds in Relation to Chemical Weed Control. (1) Study life cycle of major weeds of state as *Allium canadense*, *Cyperus rotundus*, *Solanum carolinense*, *Convolvulus* spp., *Rumex*, spp., *Amaranthus* spp., *Digitaria* spp., etc.; factors involved in various developmental stages to include: time of developmental stages of plant, seed germination and vitality; studies of effects of depth of seed, rhizomes, etc. (2) Investigate some physiological functions as: respiration, translocation, chlorophyll synthesis, use of food reserves, studies of auxin and anti-auxin activity. (3) Develop ways to grow named weeds in greenhouse, with emphasis on liquid and sand culture.

Pl. Path. HL-19

N. Mex.

Ecology of Creosote Bush (*Larrea divaricata*) on Desert Grassland Range. To determine (1) influence of good and poor cover of perennial grasses on establishment of creosote bush; (2) influence of grazing by domestic livestock and range rodents, and competition by creosote bush on restoration of desirable forage grasses to deteriorate range; and (3) certain autecological and life history characteristics of creosote bush.

Anim. Husb. 51 (See W-25 in Part 10)



Oreg. Ecology of Rabbitbrush (Chrysothamnus spp.) as a Basis for Control of Eastern Oregon Ranges. To obtain data pertinent to control of rabbitbrush on range lands of eastern Oregon.  
Anim. Husb., Agr. Econ., Farm Crops, Pl. Path. 160-8 (W-11)

Texas The Ecological Relationships, Economic Aspects and Chemical Control of Coyotillo in Texas. Learn (1) impact coyotillo has on ranch industry in terms of classes of livestock lost, season of loss, management and control used by operators on infested pastures; (2) distribution, plant associations, and related ecological factors; (3) by lab and field experiments, method/s most effective for chemical control.  
Range and For. 608-1

#### MACHINERY FOR WEED CONTROL

La. Grass and Weed Control. To evaluate and improve machines and methods (1) for disposal of crop residues in mechanical cotton production, (2) for planting cotton in mechanical cotton production, (3) for control of weeds in mechanical cotton production; and (4) for preparing cotton crop for mechanized harvest.  
Agr. Engin., Pl. Path. 858 (See S-2 in Part 3, Section b)

Minn. Design and Development of Equipment and Methods for Weed Control. To (1) learn by lab or field tests, factors which affect operating characteristics of machines or machine elements used in all methods of weed control; (2) design and develop new machines or machine elements or improve available equipment; (3) formulate recommendations on proper use of weed control equipment; and (4) conduct lab or field tests to learn performance of weed control equipment.  
Agr. Engin. 1208 Coop. USDA

Mo. Equipment and Procedures for Control of Weeds and Brush. Develop systems and equipment for control of weeds in (1) field crops, (2) horticultural crops. Design, develop, and test equipment for (3) weed control in pastures, (4) brush control on agricultural lands, rights-of-way, and commercial areas. (5) Develop more accurate and efficient methods of applying chemical herbicides.  
Agr. Engin. 153 Coop. USDA

N. Mex. Development of Improved Methods and Equipment for Planting, and Weed Control in Cotton Production. (1) Develop or modify a planter which will: plant at a uniform depth, prevent dry soil from depositing around seed; prevent void space from remaining in soil around seed; reduce lateral placement of seed to a minimum. (2) Evaluate effectiveness of planter under different weather and soil conditions. (3) Learn effect of plant spacing on yield and mechanical harvesting efficiency. (4) Develop or modify equipment and methods for complete weed control. (5) Learn picking efficiency of various harvesting machines and techniques.  
Agr. Engin. 42 (See W-24 in Part 3, Section b)

N. Y.                    The Basic Requirements and Design Principles of Mechanical  
 (Cornell) Equipment for Control of Insects, Diseases, and Weeds. To study  
 the requirement of mechanical equipment for pest control practices  
 with the objective of determining basic information necessary to  
 design new or to modify existing available equipment for practical  
 use. To design and construct equipment for experimental use for  
 the purpose of determining practical control measures and suitable  
 machinery.

Agr. Engin., Flor., Ent., Veg. Crops, Pl. Path 32

N. C.                    Weed Control Methods and Machinery. (1) Evaluate methods  
 and equipment for controlling weeds under varying weather and soil  
 conditions. (2) Develop equipment to provide effective control in  
 an efficient and economical manner.

Agr. Engin. 9 (See S-2 in Part 3, Section b) Coop. USDA

Oreg.                    Effects of Nozzle Design and Solution Properties on Drop Size  
and Spray Drift. Learn effects of nozzle design and solution  
 properties on spray drift; learn drift potential of each nozzle  
 type and size.

Agr. Engin., Agr. Chem. 313



ARS-23-8:		
Part :	Subject-Matter Area	Title of Section
Numbers :		
12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	a. Human Nutrition b. Housing c. Clothing & Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops b. Diseases of Field Crops c. Diseases of Fruit Crops d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	a. Soil Chemistry & Microbiology b. Soil Fertility, Management & Soil-Plant Relationships c. Soil Physical Properties, Conservation & Classification
22	Vegetables	a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control





